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RESIN SHEET WITH ATTACHED RELEASE SHEET AND MULTILAYER CIRCUIT BOARD
[Rikei sheet tsuki jyushi sheet oyobi taso haisen kiban]

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Claims

1. Resin sheet with an attached release sheet characterized in that a resin varnish that comprises a thermoplastic resin, triaryl isocyanurate, a fire resistance agent, a reaction initiator, and a solvent added to polyphenylene oxide, and also includes the addition of a filler if necessary is coated on a release sheet and dried.

2. A multilayer circuit board characterized in that a multilayer wiring laminate that has a resin sheet, which is a resin sheet with an attached release sheet wherein a resin varnish that comprises a thermoplastic resin, a triaryl isocyanurate, a fire resistance agent, a reaction initiator, and a solvent added to polyphenylene oxide, and also includes the addition of a filler if necessary is coated on a release sheet and dried, and the release sheet is removed, is respectively included on the upper face and lower face of an inner layer material in a required sheet that has circuits formed, and an outer layer material is arranged in the most outer layer, is laminated and is integrated .

Detailed explanation of the invention

Industrial application field

This invention concerns multilayer circuit boards that are used in electronic devices, electric devices, computers, and communication devices, for example, and prepregs used in them.

Prior art

A conventional multilayer circuit board has an inner layer material with circuitry formation and an outer layer material laminated and integrated with the inclusion of a heat-hardening resin impregnated paper and cloth, but the dielectric rate of the prepreg is affected by the paper and glass as the base material. As a measure for it, the use of a prepreg that has an epoxy resin adhesive coated on the upper

and lower surfaces of a polyimide resin film has been attempted. However, complication of the process due to application of the adhesive and a decline in the heat resistance have become issues. Furthermore, the use of a resin impregnated porous fluororesin base material as the prepreg has also been attempted. However, disadvantages are that the result is expensive and cannot be used in a wide range of applications.

Problems to be solved by the invention

As described in the prior art, resin impregnated base materials and resin films with attached adhesive have advantages and disadvantages. The purpose of this invention, which was devised while considering the problems in the prior art described above, is to offer a multilayer circuit board that has an excellent high frequency characteristic and a resin sheet used in it.

Means to solve the problems

The aforementioned purpose of this invention was attained by a resin sheet with an attached release sheet characterized in that a resin varnish that comprises a thermoplastic resin, a triaryl isocyanurate, a fire resistance agent, reaction initiator, and a solvent added to polyphenylene oxide and also includes the addition of a filler if necessary is coated on a release sheet and dried, and a multilayer circuit board characterized in that a multilayer wiring laminate that has a resin sheet, which is said release sheet attached resin sheet, from which the release sheet is removed, is respectively included on the upper face and lower face of an inner layer material in a required sheet that has circuits formed, and an outer layer material that is arranged in the most outer layer, is laminated and integrated. This invention will be explained in detail below.

The polyphenylene oxide that is used in this invention includes modified types and is not restricted in particular. However, it is desirable that the addition amount be 20-70 wt parts (will be simply referred to as parts below). Thermoplastic resins including polybutadiene resin, polyester resin, and polybutylene terephthalate resin, for example, that are soluble in polyphenylene oxide resin can be used without restriction in particular. The desirable addition amount is 2-30 parts. Triaryl isocyanurate monomers and prepolymers can be used, and the desirable addition amount is 10-70 parts. The fire resistance agent is not restricted in particular, but tetrabromobisphenol A derivatives and bromated aromatic compounds, for example, are desirable, and the addition amount is not restricted in particular. An organic peroxide is used as a reaction initiator, and the desirable addition amount is 1-5 parts. The use of toluene and Trichlene, for example, is desirable as the solvent, but it is not restricted in particular. The addition amount can be adjusted depending on the coatability. The type of filler that is added, if necessary, is not restricted in particular. However, the use of inorganic fillers including clay silica, talc, calcium carbonate, aluminum hydroxide, and ceramic powder, for example, with grain particles of 1-10 microns is desirable. When a filler is added, the addition of a silane coupling agent is desirable. As the release sheet, plastic films, such as polyethylene terephthalate film, polybutylene terephthalate film, polyimide film, polyphenylene sulfide film, fluororesin film, and cellulose triacetate film, for example, and metallic foils, such as copper foil and aluminum foil, for example, can be used without any restriction in particular. It is desirable that the aforementioned resin varnish be coated over the aforementioned release sheet so that the thickness after drying will be 5-500 microns.

An inner layer material that has circuits formed on the surface of a resin plate consisting of a heat hardening resin and thermoplastic resin, for example, and a laminated plate can be used, and it is not restricted in particular. As an outer layer material, metallic foils including copper foil and aluminum foil, for example, and a laminated plate with a metal lined on one side can be used. As the resin sheet that is

arranged at the upper and lower faces of the inner layer sheet, the aforementioned resin sheets can be arranged as required.

This invention will be explained based on an application example below.

Application example

A resin varnish consisting of 45 parts polyphenylene oxide, 15 parts polybutadiene, 20 parts triaryl isocyanurate monomer, 20 parts triaryl isocyanurate prepolymer, 10 parts tetrabromo bisphenol A, 2 parts perbutyl P (reaction initiator, manufactured by Nippon Yushi K.K.), 100 parts aluminum hydroxide with grain particles of 5 microns, and 200 parts toluene is coated on a fluororesin film with a thickness of 25 microns (manufactured by Daikin Industry K.K., product name Polyfuron film) so that the thickness after drying is 100 microns, dried, and a resin sheet with an attached release sheet is obtained. Next, electric circuits are formed on both surfaces of a glass cloth base material epoxy laminated board that has copper lined on both surfaces as an inner layer material. A lamination that has a copper foil with a thickness of 0.035 mm arranged on the upper and lower faces of said inner layer material respectively with the inclusion of a resin sheet, which is the aforementioned resin sheet with attached release sheet, from which the release sheet is removed, is laminated and molded at a molding pressure of 40 kg/cm² at 180°C for 100 min, and a 4-layer circuit board is obtained.

Comparative example

Processing is the same as in the application example except for using a glass cloth base material epoxy prepreg at a thickness of 0.1 mm as the resin sheet, and a 4-layer circuit board is obtained.

Table 1 shows the performances of the 4-layer circuit boards in the application example and comparison example.

Table 1

	(1)	(2)
	実 施 例	比 較 例
(3) 絶縁層の誘電率 ϵ_r	2.7	4.3
絶縁層の誘電正接 $\tan \delta$	0.006	0.017

Keys: 1 Application example

2 Comparison example

3 Dielectric rate of the insulating layer

Dielectric dissipation factor of the insulating film

Effect of the invention

This invention has the structure described above. It has the effect of obtaining a multilayer circuit board with an excellent high frequency characteristic in the resin sheet with the attached release sheet and the multilayer circuit board with the structure described in the range of the patent claims.